CIIAPTEB II

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PHYSICAL CONDITIONS IN AN OPRN-IIKARTH FURNACE

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IF one considers (.ho entire system as filled with air of the usual temperature and connected with the atmosphere at the points a and ///-(r/'r/c I°igs. LA and lit), so that atmospheric pressure will obtain throughout, the. contents will be in quiescence; but if individual portions of tho furnace system are filled with gases which aiv lighter than tho air, so will the equilibrium be destroyed. A want o£ balance can IK*, established owing to tho different composition of tho air and of the gas, through the heating of these, or from both causes. As, however, tho gas in the furnace system will bo lighter than that of the surrounding atmosphere, so must a buoyancy result, the amount of which can bo calculated in the following manner:—

If one takes as an example that the producers and the gas flues are filled with gas at a mean fmnpuraturo of 800", one iinds from the formula

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1(1} O-OOMTxSOO)

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that, by heating to tho height given, the volume of 1 cubic metro of gas is increased to 8*1)^(5 cubic metres. Under normal conditions, the ga,s at a temperature of 0°, and under a pressure of 700 nun.of mercury, has a weight of 1*18 kilogramme

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per cubic, metre, the. weight of tho same gas at 800°= ^:— =

about (ViJ kilogramme.

Outs can compare the portion (ah) in 'Fig. 2—that is to say,

FIG. 2.